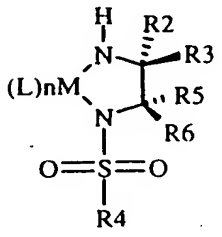
What is claimed is:

1. A method of initiating an a-amino acid -N-carboxyanhydride monomer polymerization comprising combining an NCA monomer with an initiator molecule comprising an amido-containing metallacycle, which contains a nucleophilic alkyl amido group stabilized by a rigid chelate and a non-nucleophilic proton-accepting group, wherein the proton-accepting group is selected from the group of amido sulfonamidate, an amido-amidate having an extracyclic nitrogen, an amido-ureate, and amido-carbamate, or an amido-aldimate.

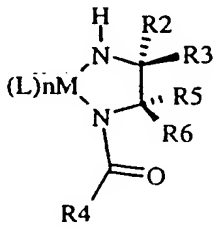
2. The method of claim 1 wherein the initiator molecule contains a low valent transition metal.

3. The method of claim 2 wherein the the low valent transition metal is ruthenium.

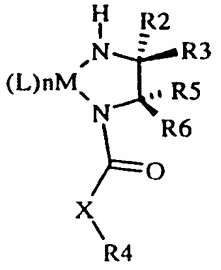
4. The method of claim 1 wherein the initiator molecule is of general formula I, II, III or IV:



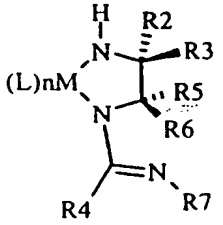
I



II



III



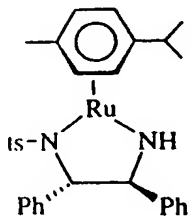
IV

wherein L is a Lewis base ligand; M is a low valent transition metal; R2 , R3, R5, and R6 are each independently hydrogen or any organic substituent not bearing free amine, hydroxyl, carboxylic acid, sulfhydryl, isocyanate, imidazole, or other highly protic or nucleophilic functionality; R4 and R6 are any organic substituent not bearing free amine, hydroxyl, carboxylic acid, sulfhydryl, isocyanate, imidazole, or other highly protic or nucleophilic functionality; and X is oxygen or NH.

5. The method of claim 4 wherein R2 and R6 are hydrogen and R3 and R5 are phenyl.

6. The method of claim 4 wherein the Lewis base ligand of the initiator molecule is p-cymene.

7. The method of claim 1 wherein the initiator molecule is of the following general formula:



wherein ts is tosyl and Ph is phenyl

8. A polyaminoacid chain comprising at least ten consecutive oligo(ethyleneglycol)-conjugated amino acid resdues.

9. An amphiphilic block copolypeptide comprising a soluble block polypeptide and and an insoluble block polypeptide, said soluble block having at least about 30% mole percent identical amino acid residues having charged or oligo(ehtyleneglycol)-conjugated side chains and said insoluble block comprising at about 60 to 100 mole percent nonionic amino acid residues.

10. The amphiphilic block copolypeptide of claim 9 wherein the insoluble block comprises about 3 to about 60 mole percent of the total copolypeptide.

11. The amphiphilic block copolypeptide of claim 9 wherein the nonionic amino acid residues are selected from the group consisting of phenylalanine, leucine, valine, isoleucine, alanine and methionine.

12. The amphiphilic block copolypeptide of claim 9 wherein the amino acid residues having charged side chains are selected from the group consisting of glutamic acid, aspartic acid, arginine, histidine, lysine, and ornithine.

13. The amphiphilic block copolypeptide of claim 9 wherein the amino acid residues having oligo(ehtyleneglycol)-conjugated side chains are selected from the group consisting of EG-cysteine, EG-lysine, EG-serine, and EG-tyrosine.

14. A chain-end functionalized block polypeptide having ten or more consecutive identical amino acid residues and an endgroup selected from the group consisting of an oligosaccharide, oligonucleotide, fluoresent molecule, polymer chain, small molecule therapeutic, or reactive chemical linker to attach the block copolypeptide to another molecule.

15. A chain-end functionalized block copolypeptide having an end group selected from the group consisting of a napthyl group, an alkyl group, an allyl group, and cysteinamide.